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	COUNTRY	: 1	USSR	
	SUBJECT	:	TACTICAL MISSILE AND ARTILLERY COLLECTION: Questions in the Control of Missile Large Units, and the Artillery"	"Some 0X1-HUM
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	Some Questions in the Control of Missile	
	Large Units, Units, and the Artillery	
	At the present time it is generally recognized that the decisive role in routing the enemy in a modern bath and operation belongs to fire and primarily to nuclear, strikes. However, as was shown by the experience of an exercises that have been carried out, fire can have a decisive importance only under firm, continuous and exceptionally clear—cut control of the missile large ununits, and the artillery. The control of these weapons must be such that it would be possible to deliver power fire strikes against the enemy in the shortest possible time, during a highly dynamic offensive operation with high speed troop operations inherent in it, and with sharp changes in the situation. The chief shortcoming in controlling missile large units and units, which was noted in a series of exercisis that commanders and staffs spend much time, sometime up to several hours, for the preparation of nuclear/misstrikes and the transmission of fire missions to those will execute them directly. As a result of this, the strikes are delivered late and are not always effective particularly against mobile targets. With the aim of determining the most advisable methof control, at one of the exercises which was conducted a series of means of automation and mechanization was for control at the level of the army corps, missile braissile battalion and tank division, tactical missile battalion of a tank division, and artillery battalion. The exercise showed that even the use of means with slamechanization increases to a considerable degree the reliability of control and decreases the time periods delivering nuclear/missile strikes against the enemy.	tle /missile ary mits, sful e ses, es ssile who e hods d, used igade, ight
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The purpose of this article is to make the experience of this exercise known to generals and officers who are studying problems of controlling missile units and articlery. Therefore, the positions set forth in the article should be adopted in conformance with the specific situation, but some positions need further study and checking.

In the army corps and division, the control of missile units and the artillery in the exercise was carried out by the chiefs of artillery and their staffs on the basis of adopted decisions and instructions from the corps (division) commanding officer.

In taking into consideration the experience of previous exercises, the work of the artillery staffs was organized in such a way that the control of missile units and artillery was stable and continuous during the preparation for the offensive as well as during the course of it, and also when one of the control points was put out of action. For this purpose, two control groups were organized beforehand from the composition of the staffs. It was intended to use one of these groups for control from the command post and the other from the forward command post. The existence of two groups was also to have facilitated control when shifting command posts during an offensive.

Two mobile control points were prepared in the artillery staff of the army corps based in buses of the staff.

For control from the forward command post, the mobile point had a table for working on the fire control map, a signal-code device, an extension device of an R-118 radio set, a telephone apparatus linked with a secrecy device, a subscriber's set of the dispatcher's loudspeaker device (dispetcherskoye gromkogovoryashcheye ustroystvo-DGU), and telephone apparatus for wire communications. Besides the listed means, the forward command post had R-104AM, R-125, and R-118 radio sets. Control from the forward command post was carried out by the chief of artillery of the army corps, to whom a group of staff efficers was subordinate, consisting of two officer-operators, an intelligence officer, and a signalman.

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At the corps command post, from which control was	
to be executed by the chief of staff of the artillery	
with one intelligence officer subordinate to him, there were R-125 and R-118 radio sets and also a secrecy	
(zasekrechivayushchaya - ZAS) device.	
In the division, both mobile control points were mounted on armored carriers (BTR-50 PU) (Armored Carrier	
50 Control Point (bronetransporter-50 punkt upravleniya)	r- '
and the radio means were housed in special radio vehicle	es.
The experience of the exercise showed that this or gazization of the work of artillery staffs is justified	-
only when the control groups are staffed with the neces:	sarv
number of officers and are supplied with technical mean	S
of control and communications. For example, in an army	
corps it is necessary to have in the composition of each	h
of the control groups a minimum of two officer -operator an intelligence officer, and a signalman, to control the	rs,
missile brigade, the artillery of 3 or 4 divisions, the	е
antitank reserve, and other weapons.	
When this requirement was not met in the exercise	
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because of the small size of the artillery staffs and a	lso
because of the small size of the artillery staffs and a because of several other reasons, it led to the fact the in the army corps, control was actually carried out by	at the
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The experience of the exercise also shows that control of the missile units and the artillery from the forward command post and the command post is not completely advisable. It is more advisable to control from one command post, and in the event it is put out of action to have a previously prepared alternate command post. In this case, the chief of artillery and the artillery staff of the corps (division) are located at the command post. In this, the work of the staff is organized in such a fashion that control is effective and guarantees the adoption of decisions and informing subordinates of their missions in the shortest possible time. Each officer of the staff must know his functional duties and have all the necessary means to fulfil them.

It is advisable to have one or two officers from the artillery staff and previously organized communications at the alternate command post, in the event control is transferred to it. During control from the command post, the communications means of the alternate command post must receive only, so that the staff officers are constantly ast of the situation and know the position of the missile uses and the artillery, their security, and the missions being accomplished.

The chief of artillery and the chief of staff of the artillery must also report to the alternate command post about all the orders given by them. The transfer of control from the command post to the alternate post can be carried out according to a previously established signal, upon the command of the chief of the corps (division) artillery or of the chief of staff of the artillery.

The control point of the chief of artillery is an inseparable component part of the command post of the corps (division) commanding officer. In order to guarantee effective use of the missile units and the artillery, the chief of artillery and his staff must be located in place, in the immediate vicinity of the corps (division) commanding officer; and in the event of a transfer, he must follow the vehicle of the corps (division) commanding officer, thus ensuring the capability for rapid preparation of the nuclear/missile strikes to be delivered in accordance with the decision made on them.

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	The separation of the chief and the artiller the corps (division) commanding officer and during a shift of control points was one of for the delay in the timeliness of delivering strikes.	his staff
	At the exercise which was held, the chi of the army corps and division did not posse equipped mobile control posts, which negati control during the offensive. Control posts based in buses and armored carriers do not the task because they do not have the necessand communications means and, moreover, do not necessary to the convenience of work. Control and communications must be located in a mobile point in such a paring them for work takes a minimum amount of the work of one means does not hinder the work	vely affected which are accomplish ary control ot ensure ions means way that pre- of time and
	Communications of the chief of artillery with the missile brigade was organized on a rewith R-118 radio sets in which, besides the rof the brigade commanding officer, were inclustrations of the staff of the brigade and of the battalions.	of the corparation
/	In addition, two radio networks with R-were organized by the corps headquarters to cartillery staff with the missile brigade.	125 radio sets onnect the
	Communications of the artillery chief an the corps with the artillery chiefs and staff divisions were organized with R-104 and R-108	d staff of s of the radio sets.
	Radio relay communications in the corps toward the control points of the divisions and missile brigade. In this, one of the telephon relay communications channels of the forward with the missile brigade was made secure with	were organized i of the ne radio command post a ZAS device
	The exercise showed that it was not advis	sable to
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	include the radio sets of the commanding officer of missile brigade and the commanding officers of the battalions in the radio network of the chief of the artillery because this leads to a severe everloadi artillery did not in practice have any reliable commanding officers of the missile battal load of the R-lls radio network by using ultra shorticer of the missile brigade also did not give the control points, the distances between them evereded the sets types of radio sets. It is most advisable to organize radio communications in the atvisable to readio sets. It is most advisable to organize radio communications in the army corps and higher. When the user sood communications in the army corps and higher. When the user sood communications by microphone, audio telegraph,	rissile c corps ng of rps mmunications ions on the work twave ling of- needed g the cations cofficer this, mmuni- s were red
	A correct determination of the working frequence for artennas of ground and space radiation has great ficance for the stability of radio communications. It the exercise there were frequent instances when communications by R-118 radio sets were lost precisely for the casions. Frequencies must be determined by the staff that the combat activities of the large unit (unit) and containing to the distances over which stable radio communication must be maintained during the course of combat artillery did not have independent channels for radio a result there were instances of unjustified delay in mitting orders and commands to missile units. Thus,	signi- In Ini- Iese of the Ons of II-
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for example, because communication lines were being used by the corps staff, a combat order for the missile brigade to prepare a nuclear strike was transmitted 15 minutes late. In another instance, for the very same reasons, an order for a brigade to move was delayed for 55 minutes. All this could result in the untimely fulfilment of assigned missions by the missile brigads.

The experience of this exercise, as well as of previous ones, once more showed that to ensure stable control of missile units, the chief of artillery must be given independent secure communication channels.

Of the communication channels having the ZAS device, the one most used in the exercise was the telephone communication channel. Radio relay communication channel proved to be less suitable for this purpose because even with the presence of ZAS, much time was lost in delivering telegrams to the communications center, which prevented staff officers from doing operational work. In order to decrease the time in using the telegraph communication channel, it would be advisable to have a teletype right at the mobile point of the chief of artillery.

It should be pointed out that one of the shortcomings in using the ZAS device was the tendency of the staffs to transmit information without proper processing, which led to a lowering of the requirement for brevity in orders. With this, control became less specific, and the time required to transmit information increased. The experience of the exercise indicates the meed to formalize the most frequently encountered orders and reports in controlling missile units and artillery in order to make them as short as possible and in this way to reduce to a minimum the time needed for their transmission. In this connection, it is advisable for each level of control to work out and establish a list of the basic data needed to control subordinate large units (units and subunits). In particular, the artillery headquarters of the corps, as was shown by the experience of the exercise, must constantly have information about the location of launch batteries and now they are provided with missiles according to the periods of launching, about the availability and yields of the missiles in the technical support platoons of the battalions, and in the technical battery of the brigade, about the location of the brigade command post, and other information.

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	corps, missile by device was used to messages. Experissional-code device tion. For example single instance withe artillery state. In the exercisal owed us to decreate the artillery state. In the exercisal owed us to decreate the artillery state. The comparison with the message codes. The staffs of the articontrol missile until the staffs were freeding and decoding of this could rend assistance in preparate to the corps. It is constantly to have addition, in transmitte down the paranter of artillery articological artillery.	igade, and batta of transmit comma ence from the exercine, in the exercinen a transmission of the corps form the brigade ise, the means of the corps form the brigade ise, the means of the corps form the brigade ise, the means of the exercine spent who is, in turn, all the commands and the artifect from the need from the need from the need from the need from the work of the extra and carryiner communication of the knowledge of the knowledge of the mitting orders extra pertaining to map, and prepare or orders for since their contact in the control, while in the extra control is a great in the extra control is the extra control in the control is the extra control in the extra control in the extra control is a great in the extra control in the extra control in the extra control is that in we can be extra control in the e	ercise showed that able means of communication us their missions. I communication us times the time need their missions is their missions and division to spend time or orders and as a result of the artillery state of the artillery state situation and, in ach staff officer their, enter the necessary state of the staff officer their, enter the necessary state of the control of the cont	the the unica- and e of ed ded ed ded ion to ively. is ult eactical edly aff aff aff n could essary the of stance means the ion for the i to ise ie
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	The experience of the	
	The experience of the exercise also indicated the notative sound recording apparatus in the artillery staff to have sound recording apparatus in the artillery staff down combat orders as they are received; much useful time that is wasted on this. In particular, portable dictaphones can be used for capable of recording for 30 to 40 minutes can be used for record orders and commands transmitted over a telephone channel which has the ZAS device. In selecting the yield of nuclear charges needed to channel which has the ZAS device. In selecting the yield of nuclear charges needed to the corps used the P-1 graph. A device for planning fire the corps used the P-1 graph. A device for planning fire division. This device had been suggested by the is given in the Collected Works of the Academy, No. 36). device for planning fire allowed us to carry out the selection of the charge with the required yield in a shorter time that the charge with the required yield in a shorter time. For working convenience, it is advisable to have a existing yields of nuclear charges for a given type of missing fire allowed us to carry out the selection of the existence of a device for planning fire, works, can be used to evaluate the effectiveness of the missiles with nuclear charges for a given type of missing particularly in those instances when there are existing particularly in those instances when there are organized to control its fire and mobility. In the missile brigade two mobile control points were of a GAZ-G3 truck, had a table for working on the fire control map, had working places for the brigade commanding control map, had working places for the brigade commanding	This
	prices for the brigade commanding	
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	a trailer; it had a map, working places and the telephone opspeaker communication radio sets, and an ifor the signal - conformation for the signal - conformation, and stamping at boards, a set of steplanning at tion, and stamping different channels we talion commanding official of artillery), over the radio relay lery, over R-118 and telephone channels in Loudspeaker command the chief of state communication with the device, the vehicle is secret unit, the ciphof the control batter	the telephone of the radio set and the body of the ched in which two cated (for community and the battation officers of the continuous of the chassis of table for working for the chief of erators, as well in apparatus, portiluminated diagrading device was control points to rafting sets. A special places communications of the channel; with the R-105 radio sets aving the secrecy munications of the fof the brigade e operator working where the ZAS deviced into two sets and the continuity of the c	apparatus, per a loudspead truck snap-of sets of sincation with a lion command the brigade set of the GAZ-63 on the firstaff, the as places for table componim (tablo). located in there were per the radia set of the communication of the communication of the communication of the communication of the commanding on the since was located the commanding on the since was located the commanding of the commanding	cortable king device. In (pristyazh gnal- h the chief ing officers taff. aff of the truck with e control staff office or the loud- ents of the The apparat the trailerl plotting tion situa- to organizin tions over e: with bat- etwork of th as well as corps artil- relay and g officer ed for gnal-code ated, the ing officer he staff	e) as well ers, us
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Declassified	the chief of intelligence, the chief services, the deputy chief of staff meteorological support, and the chievas headed by the brigade commanding other consisting of the deputy chief section, a staff officer, the deput the commanding officer of the control ficer of artillery armament, was staff of the brigade. The chief end was also found here. When located in place, the full staff was used for control, and the which had previously been organized made it possible to ensure that miss at any time and, in addition, to or period for the personnel. In shifting one of the brigade's gade commanding officer, with a cont forward to a new command post from what this time the chief of staff rema post and directed the brigade's fire officer reached the new command post ganized there. The chief of staff wind mained. The organization of control which exercise, on the whole, justified its however, there were a number of short support of control. The mobile point meet the requirements of control in met the requirements of control in mition either by their size or by their the mobile points of the missile high cross-country ability, have the change of the planning, and reliable means of communication of control when located in place of exercise showed the need to have at the chief of have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the care is showed the need to have at the ca	of the chemical for topographical of communication of the operation y chief of communication of the operation y chief of communication of the operation of the operation of the operation of the bright of the operation of the bright of the operation of the operat	50X1-HUM 50X1-HUM and ons, cations, fof ade eroups ment omplished est bri- ed control. mand ing r- re- time, chnical ot opera- lity. for
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pare of t muni also	gnal-code device, an illuminated diagram, a folding e for working on the fire control map, and also pro- ded places for telephone apparatus, portable componer he radio sets, and an apparatus for loudspeaker con- cation. As the means of control improve, there sho be an improvement in the equipment for the mobile rol points.	e- nts
quire The s sible	Radio sets of the R-118 type best fulfil the remember for controlling missile units during combat. use of ultra shortwave radio sets is primarily possewhen the brigade is located in place.	
of mi recep 150 t	Taking into account the possible bounds of movement issile units, radio sets which would ensure steady to 200 kilometers under any conditions of combat account and any and night, are essential for them.	
comma artil appar were by ra secremade to the vious prepar can be is for battal chief communa nucl the brigad	As a rule, the brigade commanding officer received inds to prepare nuclear strikes from the chief of lery of the corps by telephone through the secrecy atus and through the signal-code device. The missisent to the battalions by the signal-code device or did with the use of prearranged message codes. Used to communication channels and the signal-code device or cy communication channels and the signal-code device it possible to decrease the time of sending mission exercises. A charper decrease in comparison with preparation by 2 to 2.5 times in comparison with preparation suclear strikes, as was shown by the exercise, and at all levels of control right up to the missil lion and battery inclusively. In this instance, the of artillery could, by using secure channels of lear strike directly to the battalion, bypassing the strike directly to the battalion, bypassing term, particularly if it is on duty.	e of/ ee e-
device	s for controlling the fire of the missile units.	5074 111 154
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	To determine the effectiveness of the firing, the "P-1" plotting board is inconvenient to handle, and the set of stamping devices could not be used by missile units because of the absence of needed code signs; the set of rulers and stencils for entering the radiation situation is cumbersome; it has a large set of rulers which causes inconvenience in the work. Work in this direction must be conducted both in military educational institutions as well as among the troops.	
	In the missile battalion, control of fire and maneuv must be carried out by the battalion commanding officer from a mobile control point on the chassis of a GAZ-63 truck with a single axle trailer where the battalion staf is located. The battalion's section for preparation of data was located in the trailer. In deploying into comba formation, the trailer was joined to the body of the vehicle by a tarpaulin cover and, with the rear door of the bus open, formed a single unit with it. This ensured personal contact of the battalion commanding officer and chief of staff with the data preparation section.	f t
	The equipment inside the control point included a table for working on the fire control map and places for locating the signal-code devices and telephone apparatus. The trailer was equipped with places for the work of the data preparation section.	
	Of the mechanized means, the battalion used an electronic computing machine (elektronno-vychislitelnaya mashinaEVM) to calculate the fire settings. This machine was located at the battalion control point. The exercise showed that it is more efficient to have the EVM for preparing data in the battalion fire control vehicle. This will make it possible to avoid technical means of communications between the battalion commanding officer at the EVM operator and, consequently, to decrease the time needed for preparing firing data. In addition, the comma officer and the chief of staff of the battalion will be a in this instance, to control the work of the EVM operator cause they will be able personally to observe the initial data fed into the EVM and the results of the computations which are received.	nding ble, be-
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The use of an EVM in the battalion to prepare initial data made it possible to decrease the time for passing the command at the battalion or battery level by more than 2.5 times. It must be noted that the EVM accuracy than 2.5 times. It must be noted that the EVM accuracy reliable control over the accuracy of the computations reliable control over the accuracy of the computations made and releases the battalion commanding officer and the battery commanding officers from this task. Thus, the use of mechanized means in a missile	
battalion together with significantly declarated time for preparing nuclear missile strikes makes it possible to increase the reliability of fulfilling possible to increase the reliability of fulfilling missions. It is advisable to have all the technical means for control and communications in the battalion's mobile control point must have point. The battalion's mobile control point must have cross-country ability and ensure fire control under any conditions of a situation and any time of the year or day.	ntrol
The conditions for conducting modern combat make exceptionally high demands on all missile units, including tactical missile battalions, in regard to speed in the preparation and delivery of nuclear strikes. The most specific problem in the use of tactical missile battalions is, as is well known, the calculation of initial data for firing. According to the experience of a series of exercises, up to 50 to 60 percent of the total time spent in the preparation of a nuclear strike was spent on this.	
The use of an electronic computing machine in the tactical missile battalion during the exercise made it possible to decrease the time in determining the fire settings by 15 to 20 times while there was greater accuracy in the calculations themselves. This will make it possible for tactical missile battalions to deliver strikes in the shortest possible time against any objection enemy territory, depending on the range of fire.	▼ 0
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